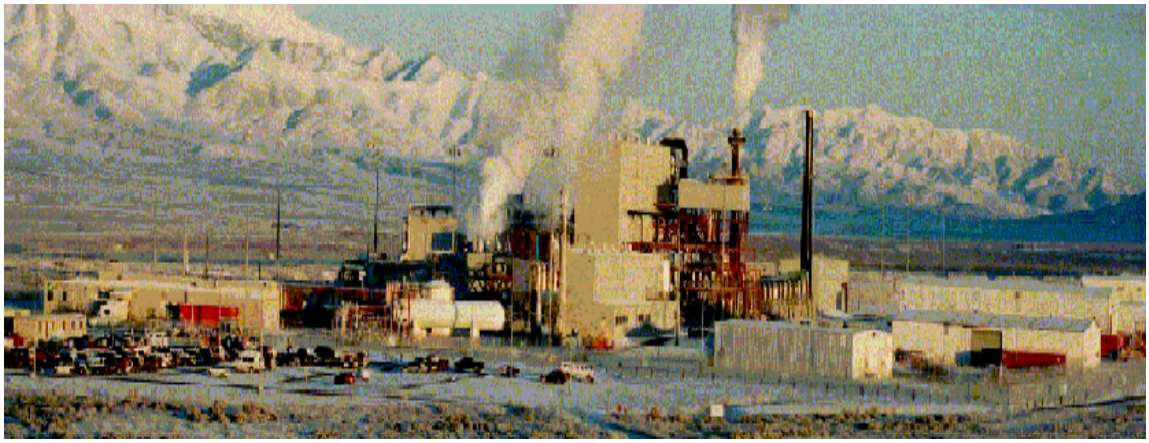
Tooele Chemical Agent Disposal Facility (TOCDF)



Request for a

CLASS 2 MODIFICATION

to the

TOCDF RCRA Permit

Request Number:	TOCDF-MPF-02-1030
Request Title:	MPF Zone Temperature Monitoring Thermocouple
EPA ID Number:	UT 5210090002

For the:

STATE OF UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

Division of Solid and Hazardous Waste (DSHW)

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TABLE OF CONTENTS

Section **Page**

1. DESCRIPTION OF CHANGE

Modification Request

The TOCDF is requesting a modification to the Resource Conservation and Recovery Act (RCRA) Permit to allow using one thermocouple (rather than the current pair) to monitor and control the Metal Parts Furnace (MPF) Primary Combustion Chamber (PCC) zone temperatures. This change would provide a consistent temperature measurement and more stable temperature control than the current method, resulting in fewer temperature/pressure fluctuations that cause Automatic Waste Feed Cutoffs (AWFCOs).

Overview

The MPF at TOCDF processes de-energized munitions, bulk containers, agent, and secondary/miscellaneous waste. The MPF PCC has three zones through which these items pass during the treatment process. Each zone has two separate and independently-acting thermocouples (temperature indicating transmitters or TITs) to control the zone temperature within the high- and low-temperature limits. The AWFCOs are activated independently; i.e., either thermocouple can cause an AWFCO. The low-temperature setpoints meet the RCRA Permit-required and Hazardous Waste Combustor Maximum Achievable Control Technology (HWC MACT)-required Operating Parameter Limits (OPLs). If the temperature measured by either thermocouple drops below a set value, the Programmable Logic Controller (PLC) triggers an AWFCO, automatically halting waste feed until the zone's temperature is greater than the alarm setpoint and the AWFCO is cleared. Table 1 identifies the thermocouple instrument numbers per zone as well as the low-temperature OPLs for mustard agent and secondary waste.

Table 1. Current MPF PCC Zone Temperature TITs and OPLs[a]

MPF Zone	Instrument ID No.	Current RCRA Low-Temp OPL[b,c]
1	14-TIT-152 & -391	Mustard: 1,171 °F; 2nd Waste[d]: 1,415 °F
2	14-TIT-141 & -392	Mustard: 1,318 °F; 2nd Waste[d]: 1,439 °F
3	14-TIT-153 & -393	Mustard: 1,321 °F; 2nd Waste[d]: 1,438 °F

[a] These OPLs were established during the 2008 MPF 155 H ATB for mustard and the 2006 Secondary Waste Feed Demonstration Test for secondary waste.

[b] For mustard and secondary waste, zone high temperatures may not exceed 1,800 °F.

[c] Although the single thermocouple will also monitor and control the PCC high temperature limits, those OPLs are not included because they will not change and this modification is concerned with low-temperature exceedances that cause AWFCOs.

[d] 2nd Waste = Secondary Waste

The temperature in the PCC is controlled by modulating fuel flow and by injecting water into the furnace. Two zone thermocouples are used for both control and monitoring. Each pair of thermocouples measures zone temperature simultaneously, and those two temperatures are averaged by the PLC, which signals the furnace to add fuel if the zone is too cool or water if the zone is too hot. Frequently, due to natural variation between thermocouple readings, the furnace system simultaneously demands both increased fuel flow and cooling water injection. This creates PCC temperature and pressure fluctuations that trigger AWFCOs.

Originally, the MPF was designed with the water sprays located on the sides of the PCC next to the controlling thermocouples. With the decision to process high heel (or heavy) ton containers in the MPF, the water spray system was modified; the water spray nozzles were relocated to the top of the PCC for greater cooling capacity to help control temperature when processing high heel munitions/waste, which changed the thermal response characteristics of the PCC. While the original configuration had the thermocouples and sprays working in concert, the current location creates discord between the cooling and heating modes. This leads to a larger difference between the thermocouple readings, which causes temperature control problems that often lead to unnecessary AWFCOs due to low temperature.

In addition, the HWC MACT regulations requiring "10-in-60-days" AWFCO reporting has increased the administrative burden of recording the AWFCOs and producing the report. Valuable site resources are also used investigating and implementing ways to mitigate these AWFCOs.

Since October 2006, the AWFCOs resulting from low temperature or pressure fluctuations make up 83 percent of the total (351) of all MPF AWFCOs. So, by reducing these types of AWFCOS, TOCDF could reduce a majority of all AWFCOs if this modification is approved. Table 2 illustrates the number of low-temperature/pressure AWFCOs in relation to the total number of AWFCOs that have occurred at TOCDF since October 2006.

Table 2. MPF Low Temperature/Pressure AWFCOs since October 2006*

Exceedance Type	Number of Exceedances	% of Total Exceedances**
Pressure	169	
Temperature	104	
Pressure & Temperature	19	
TOTAL	**292**	**83**
TOTAL ALL EXCEEDENCES (since 10/06)	***351***	***100***

* Data in table are taken from AWFCOs documented for reports TOCDF sends to DAQ. See Section 4 for supporting data.

** Total of all exceedances since October 2006 = 351. Percents rounded to nearest hundredth.

The exceedences enumerated in Table 2 had no environmental consequences or impacts. They did not adversely affect treatment of waste remaining in the furnace as demonstrated by successful low-temperature monitoring in the discharge airlock. In addition, the MPF is enclosed and any gases escaping the MPF due to high pressure are vented through the Munitions Demilitarization Building (MDB) Heating, Ventilating, and Air Conditioning (HVAC) filters before release to the atmosphere.

This permit change is classified as a Class 2 Permit Modification based on Title 40 of the Code of Federal Regulations (CFR) 270.42, Appendix I, L.4, which reads:

> 4. Modification of an incinerator, boiler, or industrial furnace unit in a manner that would not likely affect the capability of the unit to meet the regulatory performance standards but which would change the operating conditions or **monitoring requirements specified in the permit**. The Director may require a new trial burn to demonstrate compliance with the regulatory performance standards.

2. JUSTIFICATION FOR CHANGE

This Class 2 Modification is supported by 40 CFR 63.1209(j)1, which reads:

> 1) *Minimum combustion chamber temperature.* (i) You must measure the temperature of each combustion chamber at a location that best represents, as practicable, the bulk gas temperature in the combustion zone. You must document the temperature measurement location in the test plan you submit under §63.1207(e);….

As stated above, the original MPF design located the water sprays on the sides of the PCC next to the controlling thermocouples. This configuration worked well for ton containers or munitions with about a 5 percent heel because, when processed, this small heel would cause an increase in heat for only a short duration. However, the high heel tons have a much greater heel (≈40 percent) that, during processing, causes a spike in heat that lasts longer than a few seconds, requiring more efficient cooling (i.e., water spraying) in the MPF. Therefore, the water spray system was modified; the water spray nozzles were relocated to the top of the primary chamber for greater cooling capacity to help control temperature when processing these higher heels, which in turn, changed the thermal response characteristics of the PCC. The current location of the water spray nozzles in reference to the two controlling thermocouples on the sides tends to create a larger difference between the thermocouple readings, which causes temperature control problems that often lead to unnecessary low-temperature AWFCOs.

To avoid these temperature control problems, TOCDF suggests maintaining the current low-temperature OPLs for the MPF PCC Zones 1-3 using a single thermocouple for each zone. The reading from a single thermocouple per zone is representative of both the zone temperature and the average of the readings from two. These thermocouple temperatures are representative of the gas temperature in the zones, and they are documented in the appropriate test reports described below.

For this modification, TOCDF refers to the data documented in the January 2008 MPF 155-mm Projectile Levinstein (H) Agent Trial Burn (MPF 155 H ATB) Report (submitted 03 April 2008 to the Utah Division of Solid and Hazardous Waste) and the 2006 Secondary Waste Demonstration (SWDT) Report (submitted 20 July 2006 to the DSHW) from which the current MPF PCC zone low-temperature OPLs (for mustard and secondary waste, respectively) are derived. These two tests were conducted to demonstrate incinerator performance in accordance with the RCRA and HWC MACT requirements. The data from these tests were submitted to – and approved by – the DSHW as meeting the emissions and performance standard criteria specified in the TOCDF RCRA Permit, Module VI, VI.C.2.b. As none of the MPF PCC zone low-temperature OPLs will change, these data are sufficient to support the request to modify the RCRA Permit to allow using only one of the currently-required two thermocouples to measure the MPF PCC zone temperatures. The use of one thermocouple for this purpose provides a more stable temperature environment that will prevent a preponderance of low-temperature AWFCO alarms.

This modification, if approved, would allow TOCDF to control the furnace and monitor the temperature limits established by the MPF 155 H ATB and SWDT using a single thermocouple in each of the three zones. The thermocouples that Engineering selected to provide the

temperature monitoring and control are 14-TIT-152 in Zone 1; 14-TIT-141 in Zone 2; and 14-TIT-153 in Zone 3. These thermocouples were chosen because they best represent the mean gas temperature in each zone, and they will be the instruments that regulate temperature within both the high and low OPLs and trigger AWFCOs/DAL low temperature monitoring. In addition, the data from these thermocouples will be used to establish OPLs and discharge airlock low-temperature monitoring setpoints in the future. Table 2 shows the current and proposed thermocouples and illustrates that the current OPLs will be maintained.

Table 3. Comparison of Current TIT Configuration with Proposed TIT Configuration

MPF PCC Zone	Before Modification[a]			After Modification	
	TIT #	TIT Configuration	Low-Temp Limit[b]	TIT #	Low-Temp Limit[b,c]
1	-152 & -391	Simultaneous temperature monitoring	Mustard munitions/bulk containers – 1,171 °F; 2nd Waste – 1,415 °F	-152	**NO CHANGE**: Mustard munitions/bulk containers – 1,171 °F; 2nd Waste – 1,415 °F
2	-141 & -392	Simultaneous temperature monitoring	Mustard munitions/bulk containers –1,318 °F; 2nd Waste –1,439 °F	-141	**NO CHANGE**: Mustard munitions/bulk containers –1,318 °F; 2nd Waste –1,439 °F
3	-153 & -393	Simultaneous temperature monitoring	Mustard munitions/bulk containers – 1,321 °F; 2nd Waste –1,438 °F	-153	**NO CHANGE**: Mustard munitions/bulk containers – 1,321 °F; 2nd Waste –1,438 °F

[a] The MPF 155 H ATB and SWDT were conducted using these parameters.
[b] 2nd Waste = Secondary Waste
[c] Although the single thermocouple will also monitor and control the PCC high temperature limits, those OPLs are not included because they will not change and this modification is concerned with low-temperature exceedances that cause AWFCOs.

Note that failure of a single zone thermocouple will cause all waste in the PCC to be low-temperature monitored, in accordance with Module V, condition V.C.2.r, to ensure proper waste treatment. For example, if the MPF PCC Zone 1 14-TIT-152 fails, the reported zone temperature will be the high span value of the transmitter (i.e., 2,000 °F), which is higher than the low-temperature monitoring limit specified in Module V, V.C.2.r. The non-regulated thermocouple in each zone (i.e., 14-TIT-391, -392, and -393 for Zones 1-3, respectively) will be used to control furnace temperature until the tray exits the affected zone. So, if a regulated thermocouple fails, the high-temperature alarm will trigger an AWFCO alarm, and the operators will ensure that feed stops, the waste remaining in the furnace is processed, and that waste is low-temperature monitored in the MPF Discharge Airlock to ensure that no agent remains when the tray exits the furnace. When the waste has cleared the furnace and been monitored, the failed thermocouple will be replaced, after which waste feed will resume.

Impact on the TOCDF

If approved, this permit modification will have little impact on TOCDF MPF operations because it will not affect how the plant operates; however, the Tooele Standard Operating Procedure (TE-SOP)-12, page 2-20, and TE-SOP-301, Appendix E, will need to be revised to reflect the changes outlined in this modification.

Environmental Impacts

There will be no environmental impacts resulting from this change because, for each zone, one of the pair of thermocouples will continue to monitor the MPF temperature at the permitted limits established by the MPF 155 H ATB and SWDT. The MACT AWFCOs will trigger at the current, permit-required limits; emissions will continue to be within the permit-established limits; and Discharge Airlock agent monitoring will continue.

Personnel Impacts

There will be no impact on TOCDF personnel.

Physical TOCDF Impacts

There is no physical impact on the facility. However, if this modification request is approved, changes to the MPF PLC code and function testing will be required (the function tests ensure that the code changes cause the MPF to operate as expected).

3. PERMIT CHANGE PAGES

Change Pages in Permit Body

Module V, Condition V.C.2.r, page 20

Change Pages in Permit Attachments

Attachment 6, Table 6-B, page 23 and page 25 (correction of previous omission)

Attachment 19, Table D-6-1, page 12 and page 17 (correction of previous omission)

Changes to Permit Drawings

No changes to permit drawings are required.

4. SUPPORTING INFORMATION

Included with this modification is an electronic copy of a spreadsheet that documents the number of low-temperature/pressure-related AWFCOs recorded by TOCDF since October 2006. The data are collected for the "10-in-60-Days" AWFCO reports that TOCDF submits to the State of Utah Division of Air Quality. These are broken down to show how the number of low-temperature/pressure exceedences relates to the total number of AWFCOs (see Table 2 in Section 2 of this modification).

Note that the low-temperature exceedences did not adversely affect treatment of waste remaining in the furnace as demonstrated by successful low-temperature monitoring. In addition, the MPF is enclosed and any exhaust gases escaping the MPF due to high pressure is vented through the MDB HVAC filters before release to the atmosphere.